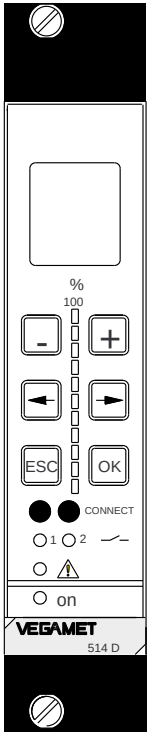
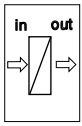
Level and Pressure

Operating Instruction

VEGAMET 514... D





Contents

Safety information 2

1 Product description

1.1 Function and configuration 4
1.2 Types and versions 5
1.3 Applications 6
1.4 Technical data 7
1.5 Dimensions 10
1.6 Ex-technical data 11
1.7 Approvals 11

2 Mounting

2.1 Mounting versions 12
2.2 Instrument address 13

3 Electrical connection 14

Safety information

The described module must only be inser ted and operated as described in this operating instruction. Please note that other action can cause damage for which VEGA does not take responsibility.

4 Set-up

4.1 Indicating and operating elements 15
4.2 Adjustment system 16
4.3 Menu list 17
4.4 Adjustment via PC 18
4.5 Set-up sequence 18
4.6 Set-up, configuration 19
4.6.1 Configuration inputs 19
4.6.2 Configuration meas. point 21
4.6.3 Configuration output 23
4.7 Set-up, parameter adjustment 26
4.7.1 Parameter adjustment MST1, adjustment 26
4.7.2 Flow measurement 28
4.7.3 Parameter adjustment MST1 and MST2, processing 33
4.7.4 Parameter adjustment MST1 and MST2, outputs 35
4.7.5 Parameter adjustment MST1 and MST2, simulation 42
4.7.6 Parameter adjustment MST1 and MST2, special functions 43
4.8 Set-up, additional functions 43
4.8.1 Password 43
4.8.2 Linearization curve 1 … 3 43
4.8.3 Info 44
4.8.4 Language 44
4.8.5 VEGAMET Reset 45
4.8.6 Service 45

5 Diagnosis

5.1 Detailled menu list 46
5.2 Maintenance 48
5.3 Repair 48
5.4 Fault signal 48
5.5 Error codes 49

1 Product description

1.1 Function and configuration

VEGAMET 514 D and 514 DV signal conditioning instruments are designed for flow measurement.

Function

Flow measurement in flumes
Flumes or their throat cause a reflux of the measured product. The flow can be determined out of the appropriate levels.

Sensors detect levels and deliver analog or digital measured data to connected VEGAMET.

In the signal conditioning instruments the parameter "flow" is generated out of the measured data.

The output result is provided as current, volt and relay output as well as digital signal output (DISBUS).

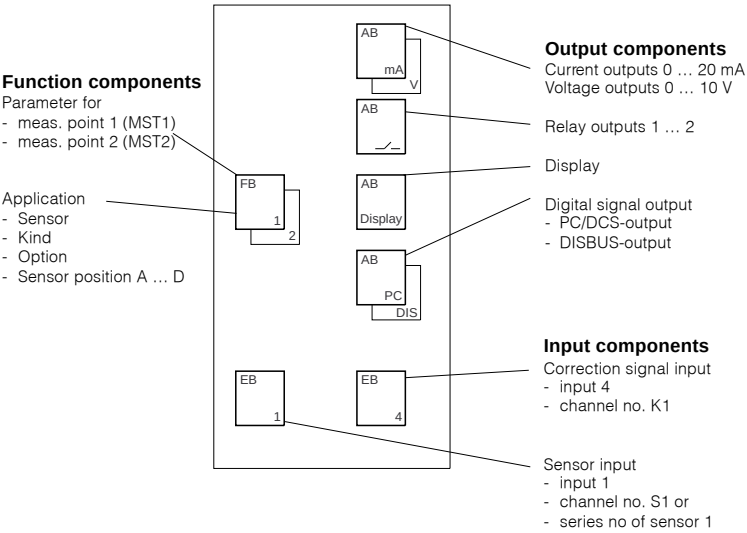
The current and relay outputs are sometimes provided with a flow specific preconfiguration.

Configuration

The signal conditioning instruments are microcomputer controlled and consist of software components.

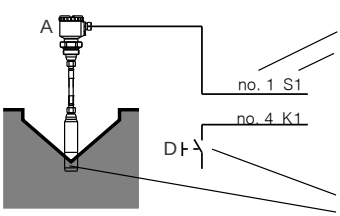
Mechanically the signal conditioning instruments are designed in 19"-technology (width 5 TE = 24,5 mm).

Sketch



Examplary application

- flow measurement in a flume
- with offset correction (by additional sensor)



Inputs
- input 1 and 4
- channel no. S1 and K1

Sensor
- offset correction signal in pos. D
- sensor 1 in pos. A

Meas. points
- MST1 = A
- MST2 = A

Parameter
- level
- flow

1.2 Types and versions

According to the application and the appropriate sensor the type and version of the signal conditioning instrument can be determined.

VEGAMET for sensors with analog measured data transmission
- hydrostatic pressure transmitter

VEGAMET	Number of inputs		Number of outpouts				
	Sensor	Correct. signal	mA	V		DIS	⚠
514 D…	1	1	3	3	2	1	1

… Ex = Signal conditioning instrument for meas. systems in hazardous areas, certificate to CENELEC

VEGAMET for sensors with digital measured data transmission (VBUS)
- hydrostatic pressure transmitter
- ultrasonic sensor
- radar sensor

VEGAMET	Number of inputs		Number of outputs				
	Sensor	Correct. signal	mA	V		DIS	⚠
514 DV	1	1	3	3	2	1	1

1.3 Applications

Flow measurement

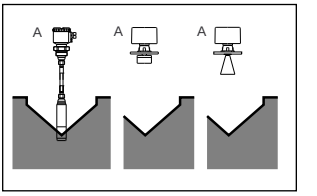


Fig. 1.2 Flow measurement

Standard

Application:	Flow
Sensor:	Hydrostatic pressure transmitter
	Ultrasonic sensors
	Radar sensors
Kind:	Level
Option:	Offset correction (only with hydr. pressure transmitter)
Parameter:	MST1 level
	MST2 flow

Option

A key connected to the correction input corrects the output results when being set to zero.

Offset correction

- in empty flume
- preferably manually with key
- parallel shifting of the adjustment characteristics
- effects MST1 and MST2

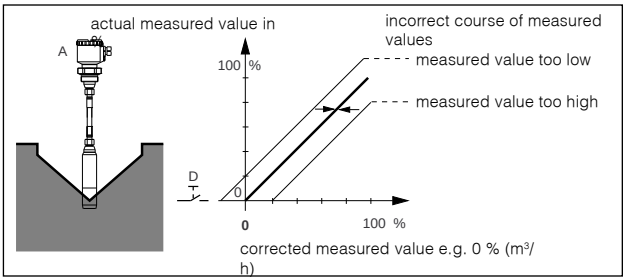


Fig. 1.13 Correction in the point

1.4 Technical data

Power supply

Operating voltage	U_{nenn} = 24 V AC (20 … 53 V), 50/60 Hz = 24 V DC (20 … 72 V)
Power consumption	
- VEGAMET 514 D	appr. 7 VA or appr. 5 W
- VEGAMET 514 VD	appr. 17 VA or appr. 12 W
Fuse	630 mA slow-blow

Measuring data input VEGAMET 514 D

Number	1 input
Kind of input	active two-wire input, analog
Range	4 … 20 mA hydrostatic pressure transmitters
Voltage	at 4 mA appr. 18 V DC, at 20 mA appr. 15 V DC
Current limitation	at appr. 26 mA, shortcircuit proof
Detection-line interruption	< 2 mA
Detection-line shortcircuit	> 23 mA
Min. adjustment delta	2 % of the adjusted sensor values
Connection line	2-wire (standard line)
Resistance per conductor	max. 35 Ω
Resolution	1 µA
Linearity error	0,025 % at 4 … 20 mA
Temperature error	0,04 %/10 K at 4 … 20 mA

Measuring data input VEGAMET 514 VD

Number	1 input
Data transmission	digital (VBUS)
Sensor	hydrostatic pressure transmitters, ultrasonic or radar sensor
Voltage	appr. 25 V DC
Power limitation	at appr. 7 W, shortcircuit proof
Connection line	2-wire (screened)
Line length	max. 1000 m
Resistance per conductor	max. 200 Ω for hydrostatic pressure transmitters max. 20 Ω for ultrasonic or radar sensors

Correction signal input

Number	1 input
Function	switching signal to trigger and offset correction
Voltage	5 V (from instrument)
Current	5 mA
External line resistor	≤ 150 Ω

>>

Current output

Number	3 outputs
Function	current output 2 and 3 can be configured and parameter adjusted as: - level proportional - flow proportional - flow pulses - sampling pulse
Output values	
- level / flow proportional	
Load	max. 500 Ω
Range	0/4 … 20 mA
Resolution	0,05 % of range
Linearity error	0,05 % of range
Temperature error	0,05 %/10 k of range
- pulse output	
Load	min. 600 Ω
Voltage pulse	12 V DC at 20 mA
Pulse length	200 ms

Voltage output

Number	3 outputs
Function	analog output of the output results
Range	0/2 … 10 V
Current	max. 1 mA
Resolution	0,05 % of range
Linearity error	0,05 % of range
Temperature error	0,06 %/10 k of range

Relay outputs

Number	2 switching relays 1 fail dafe relay
Function	can be configured and parameter adjusted as: - switching relay for level or flow - pulse relay-flow quantity - pulse relay-sampling
Contact	1 floating spdt AgNiO and hard gold plated
Turn-on voltage	min. 10 mV DC max. 250 V AC/DC
Switching current	min. 10 µA max. 3 A AC, 1 A DC
Breaking capacity	max. 500 VA, 54 W
Min. switching hysteresis (Low/High-Delta)	0,5 %

DISBUS-output

Function	digital transmission of output results and system information to VEGADIS 174 or VEGACOM 557
Connection line	2-wire
Line length	max. 1000 m

>>

Indicating element

Clear text indication	LC-display - 4 line, 6 figures each - background lightning
Analog indication	11 segments 0 % … 100 % acc. to MST-enquiry - %-value of level - %-value of flow
LED in front plate	green on: operating voltage on red: fault signal yellow (per relay): relay switching condition

Operating elements

Front plate	6 keys for configuration and parameter adjustment

Ambient conditions

Permissible ambient temperature	-20°C … +60°C
Storage and transport temperature	-40°C … +80°C

Electrical connection

Multipoint connector component	acc. to DIN 41 612, series F, 36-pole (three row) d, b, z (partly equipped)
Carrier BGT 596 (Ex)	connection to the respective module
Housing type 505	connection to screw terminals (max. 2,5 mm^2)

Electrical protective measures

Protection	
- unassembled	IP 00
- mounted into	carrier BGT 596 front side completely equipped: IP 40 upper and lower side: IP 20 wiring side: IP 00
- mounted into housing	
- terminal housing	IP 20
- housing general	IP 30
Protection	II (in housing type 505 or type 506)
Overvoltage category	II

Electrical separating measures

Reliable separation acc. to VDE 0106, part 1	between power supply, fail safe and level relay, meas. data inputs and correction inputs
- limit voltage	250 V
- isolation resistance	2,3 kV
Galvanic separation	between relay outputs
- limit voltage	250 V
- isolation resistance	1,4 kV
Potential separation	between DISBUS, transistor outputs and correction inputs
- limit voltage	50 V
- isolation resistance	0,5 kV
Common reference potential at	voltage/current outputs, correction inputs

>>

Mechanical data

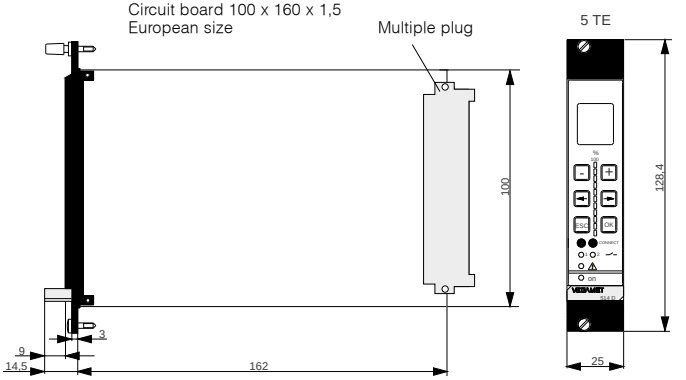
Series	module instrument for carrier BGT 596 or housing type 505 or type 506
Dimensions unassembled	W = 25, 4 mm (5 TE), H = 128,4 mm, D = 162 mm

CE-approval, conformity judgement

VEGAMET signal conditioning instruments meets the protective regulations of EMVG (89/336/EWG) and NSR (73/23/EWG). The conformity has been judged by means of a typical configuration acc. to the following standards:

EMVG	Emission	EN 50 081 - 2: 1993
	Immission	EN 50 082 - 2: 1995
NSR		EN 61 010 - 1: 1993

1.5 Dimensions



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1.6 Ex-technical data

Power supply

Operating voltage	U_{nenn} corresponds to the not-Ex-version
Limit voltage	U_{nenn} = 250 V AC or 125 V DC

Measuring data input (intrinsically safe circuit)

Classification	[EEx ia] IIC, [EEx ia] IIB, [EEx ib] IIC or [EEx ib] IIB
Max. values	
- Voltage	U_O = 20 V
- Current	I_O = 128 mA
- Power	P_O = 640 mW
Characteristics	linear
Effective inner inductance L_i	unimportant
Effective inner capacitance C_i	unimportant

	EEx ia IIC			EEx ia IIB	EEx ib IIC	EEx ib IIB
Max. permissible outer inductance L_O (mH)	0,5	1	1,5	2	2	9
Max. permissible out capacitance C_O (nF)	97	78	68	486	200	1000

The intrinsically safe circuits are reliably separated from the not-intrinsically safe circuits up to a peak value of the nominal voltage of 375 V.
The max. voltage on the not-intrinsically safe circuits must not exceed 250 V_{eff} in case of failure.

1.7 Approvals

VEGAMET are available with the following approvals:
- Explosions protection: appropriate operating instrument with intrinsically safe(s)
- Overfill protection to WHG and VbF applied

Observe with these applications the appropriate legal documents (test certificates, type approvals and conformity certificates). These are supplied with the respective instrument.

WHG-approval
Signal conditioning instrument as part of an overfill protection to WHG or VbF (applied).

Ex-approval
For hazardous areas, certificate to CENELEC defined in the conformity certificate **PTB-no. Ex-95.D.2161 X**.

2 Mounting

2.1 Mounting versions

VEGAMET 514 D ... 514 VD signal conditioning instruments can be either mounted with a module in a carrier BGT 596 or BGT 596 Ex.M or in a single housing type 505 or type 506.

Module
Multipoint connector DIN 41 612, series F, 33-pole (d, b, z) with coded pins and mounting material for mounting in carrier BGT 596 or BGT 596 Ex.M.

Module Ex
Multipoint connector DIN 41 612, series F, 33-pole (d, b, z) with coded pins, Ex-separating chamber and mounting material for mounting in carrier BGT 596 Ex.M.

Single housing
Plastic housing type 505 or type 506 for single mounting of signal conditioning instruments with a width of 5 TE (25,4 mm).

Mounting carrier

Mount the respective module (standard or Ex-version) in the carrier. Wire the connections of the multipoint connector according to the wiring plan on page 14.

The multipoint connector is available as follows:
- Wire-Wrap standard connection 1,0 x 1,0 mm
- plug connection 2,8 x 0,8 mm
- Termi-Point Standard connection 1,6 x 0,8 mm
- soldering connection
- screw terminals 2 x 0,5 mm²

For further information concerning mounting see operating instruction of the carrier.

Mounting single housing

You can either screw the housing socket directly to the mounting plate or plug on a carrier rail (TS 35 x 7,5 acc. to EN 50 022 or TS 32 acc. toEN 50 035). Connect the terminals according to the wiring plans on the following pages. For further information to the mounting see operating instruction of the housing.

Transparent cover

To protect the housing against unauthorized operation, the front plate of VEGAMET can be provided with a lockable transparent cover.

Coding

To avoid interchanging of the various signal conditioning instruments, the multipoint connector of the carrier or the housing is provided with pins and the multiple plug of the signal conditioning instrument with holes (mechanical coding).

An Ex-coding with fixed coded pin ensures that not-Ex and Ex-instruments are not interchanged.

An instrument coding ensures that the various signal conditioning instruments are not interchanged. The respective coded pins are attached to each module or housing. Provide the multipoint connector with these coded pins acc. to the following schedule and figure.

	Instrument coding	Ex-coding
VEGAMET 514 D	a5 / c5	
VEGAMET 514 D Ex	a5 / c5	c23
VEGAMET 514 VD	a7 / c5	

Fig. 2.1 Coding schedule

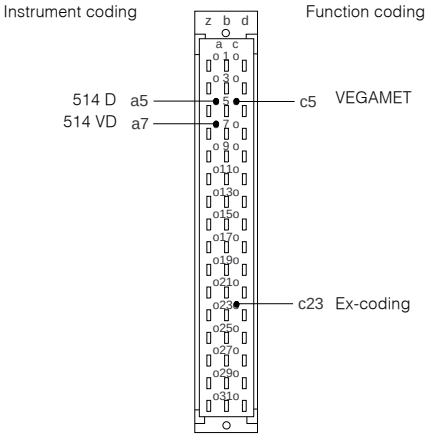


Fig. 2.2 Module coding, VEGAMET

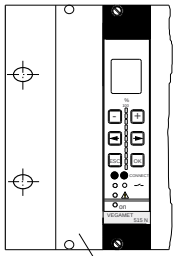
Ex-version

Note!
Signal conditioning instruments must be generally mounted outside hazardous areas or special Ex-protective measures must be taken.

Ex-separating chamber
To ensure sufficient "air and creeping distances", an Ex-separating chamber must be mounted to the connections of VEGAMET. Lead the wires through the Ex-separating chamber and connect them. Fasten the Ex-separating chamber with the lower screw. Observe the operating instrumention of carrier BGT 596 Ex.M.

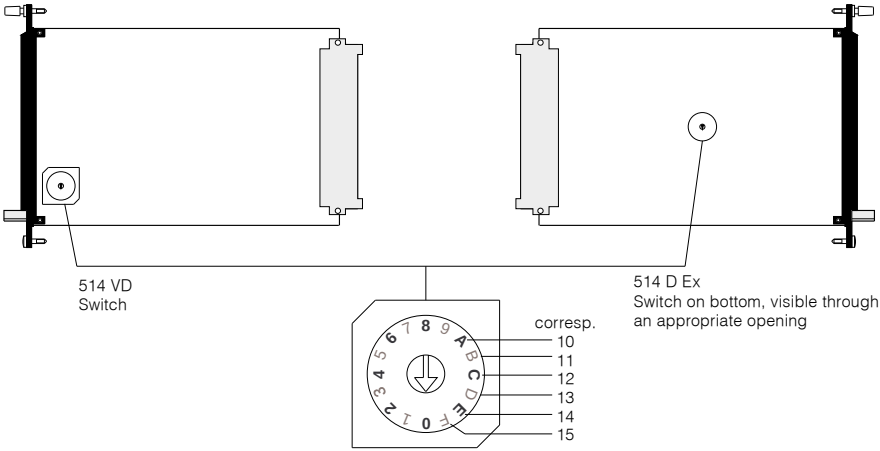
Protection for Ex-applications
In Ex-applications a protection of IP 20 must be kept. Cover the spaces or not used modules from the front by appropriate blind covers.

Mounting in carriers
If you mount your VEGAMET with Ex-approval in a carrier, you have to use a VEGA-Ex-module. Keep a distance of at least 10 mm (2 TE) to modules of other manufacturers. If you want to mount the VEGAMET in the extreme left position in the carrier, you have to mount a blind cover of at least 20 mm (4 TE) in front of the module of the instrument.



2.2 Instrument address

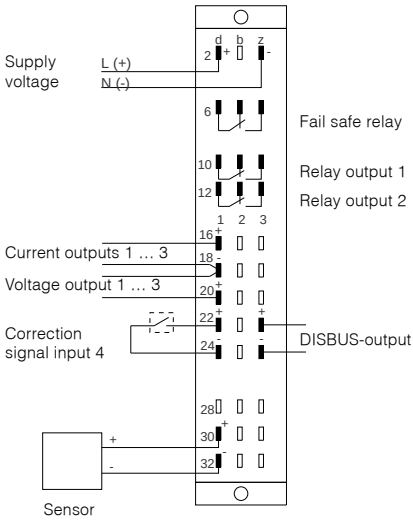
Adjust the instrument address on the appropriate switch on the circuit board. Address range 1 ...15. Observe that no address is used twice. Factory setting = instrument address 0.



Under the menu point "Instrument address" ´the adjustment carried out on the switch can be indicated.

3 Electrical connection

VEGAMET 514 D, 514 D Ex
VEGAMET 514 VD

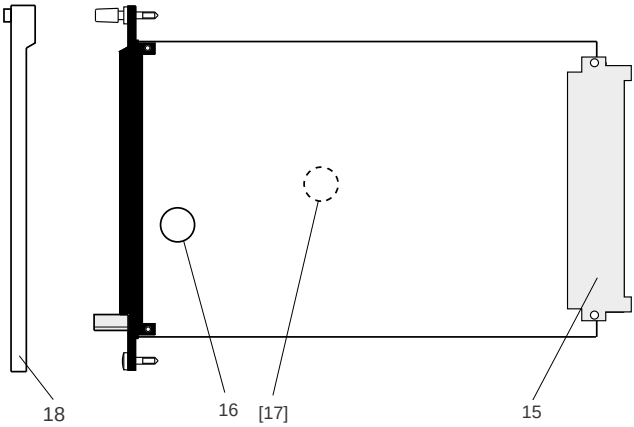


Ex-version
For connection of Ex-certified instruments observe the instructions in the attached legal documents as well as in the valid mounting instructions. Note that the Ex-separating chamber is mounted on the multipoint connector.Always lead the wires through the Ex-separating chamber. Observe the operating instruction of the carrier BGT 596 Ex.M and the Ex-instructions.

4 Set-up

4.1 Indicating and operating elements

Signal conditioning instrument



with adjustment module

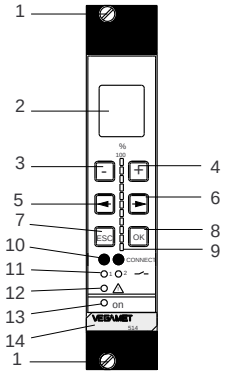
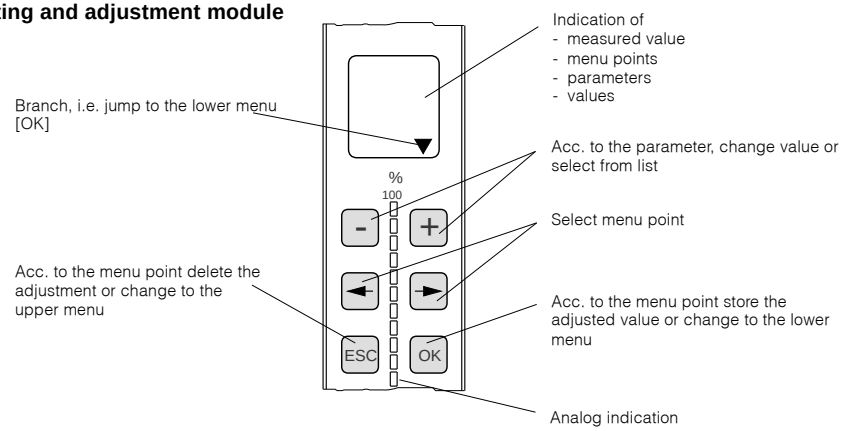


Fig. 4.1

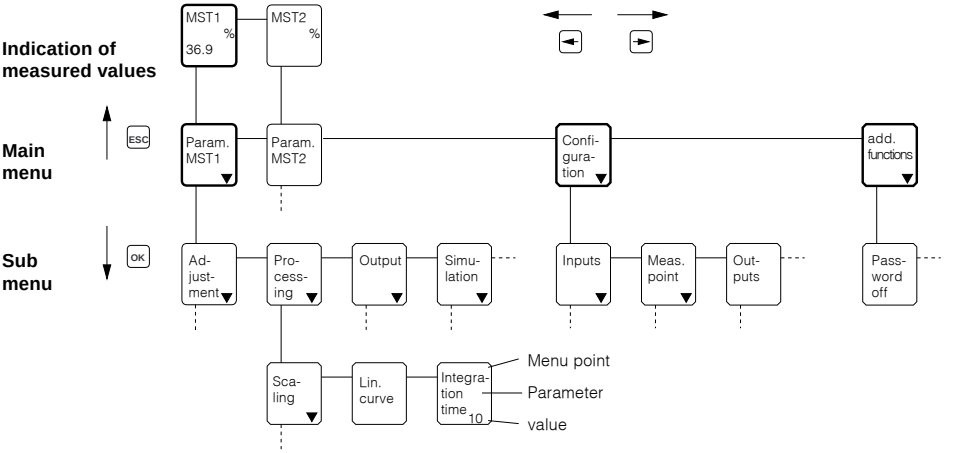
1 Lockable fixing screw
2 Display (4 lines with 6 figures each, illuminated)
3 … 8 See following page
9 Analog indication 11-digit
10 Connection for VEGACONNECT connection cable
11 LED relay output 1 and 2
12 LED fault signal
13 LED supply voltage
14 Ledge
15 Multiple plug with wiring plan
16 Position of the switch for adjustment of the instrument address [17] on VEGAMET 514 D Ex
18 Transparent cover

4.2 Adjustment system

Indicating and adjustment module


Indication of
- measured value
- menu points
- parameters
- values
Branch, i.e. jump to the lower menu [OK]
Acc. to the parameter, change value or select from list
%
100
Select menu point
Acc. to the menu point delete the adjustment or change to the upper menu
Acc. to the menu point store the adjusted value or change to the lower menu
ESC
OK
Analog indication

Menu tree



The adjustment is menu oriented and is made via six keys in conjunction with clear text indication. The jump from indication of measured values to the main menu is made with [OK]. Use [→] or [←] to change within the main menu from one menu point to the other.

A branch is indicated by the symbol ▼ and ensures with [OK] a jump to the lower menu. In each menu are thematically combined parameters (possibly in further sub menus).

Parameters are indicated by the missing symbol ▼. The value of the parameters can be modified or selected out of a list by [+] or [–]. The modified value can be stored with [OK]. Push [ESC] to interrupt an adjustment (without storing the modfication).

Certain parameters can be only indicated, however their value cannot be modified.

Reset to the upper menu is made with [ESC].
60 minutes after a key is pushed for the last time, an automatic reset to the indication of measured values.

4.3 Menu list

Values must be adjusted or modified to determine the meas. points. This determination is made separately for each meas. point by the following parameter adjustments.

Parameter adjustment MST1

- Adjustment
  - with level
  - without level
- Processing
  - Scaling (level)
  - Lin. curves
  - Integration time
- Outputs
  - Current outputs
  - Volt outputs
  - Relay outputs
  - MET-indication
  - PC- / PLC-outputs
  - DIS-outputs
- Simulation
- Special functions

Parameter adjustment MST2

- Adjustment
  - with flow
  - without flow
- Processing
  - Scaling (flow)
  - Lin. curves
  - Integration time
- Outputs
  - Current outputs
  - Volt outputs
  - Relay outputs
  - Display
  - PC / PLC
  - DISBUS-output
- Simulation
- Special functions

Adjustments and coordinations must be provided to determine the instrument functions. This determination is made by the following configurations.

Configuration

- Configuration
  Inputs, Sensor connections, mark
  - Input 1
  - Input 4
- Configuration meas. points
  - Application
  - Sensor
  - Kind
  - Options
  - Sensor coordination
- Instrument address
- Configuration outputs
  - Current outputs
  - Volt outputs
  - Relay outputs
  - PC- / PLC-output
  - VEGADIS-output

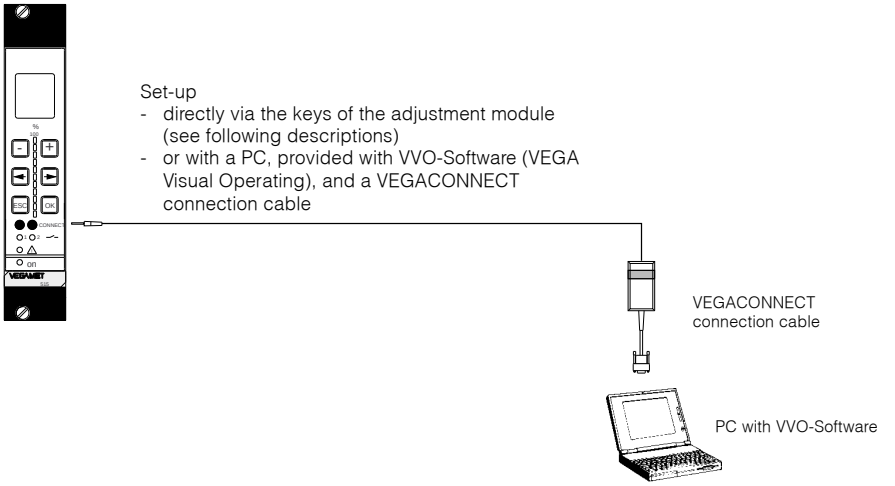
Under the section "Additional functions" all superset instrument functions, i.e. their adjustment and coordination possibilities are composed.

Additional functions

- Password
- Edit lin. curves
- Info
  - Input info
  - VEGAMET-Info
  - Program info
  - Meas. point info
- Language
- Reset VEGAMET
  - Reset configuration
  - Reset sensor characteristic values
  - Reset lin. curves
- Service

4.4 Adjustment via PC

Signal conditioning instrument with operating module


Set-up
- directly via the keys of the adjustment module (see following descriptions)
- or with a PC, provided with VVO-Software (VEGA Visual Operating), and a VEGACONNECT connection cable
VEGACONNECT connection cable
PC with VVO-Software

4.5 Set-up sequence

Configuration
- adjust instrument address
- configure inputs
- prepare meas. points
- coordinate outputs

Parameter adjustment

If you want to detect the level and the flow as parameter, it is recommended, to carry out the adjustment for MST1 and MST2 at the same time i.e. immediately one after the other.
- Parameter adjustment MST1
  - carry out adjustment
  - determine the processing
  - define outputs
- Parameter adjustment MST2
  as described above

Additional functions
- edit linearization curves
- change language (if necessary)
- activate password (if necessary)

4.6 Set-up, configuration

4.6.1 Configuration inputs

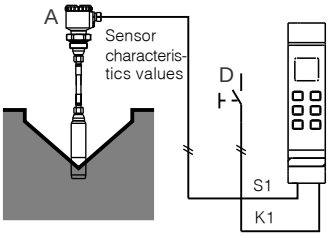
The inputs of the signal conditioning instruments are configured according to the ordered instrument version. Therefore no activities from your side are necessary. However should there be a modification necessary, you will find some explanations and connection examples in the following.

The signal conditioning instruments are either connected directly to the sensors or they receive measured data from other sensors via the DISBUS-connection.

Connection example 1

VEGAMET 514 D

- Sensors connected directly to VEGAMET
  Marking:
  The sensor must be marked via its sensor characteristics values (only hydrostatic pressure transmitters).

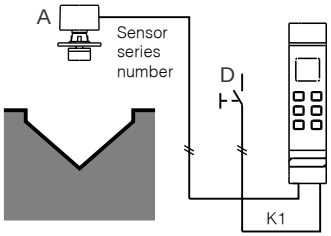


Pos. A – input 1, channel S1
Pos. D – input 4, channel K1

Connection example 2

VEGAMET 514 VD

- Sensors connected directly to VEGAMET
  Marking:
  The sensor must be marked with its series number.



Pos. A – input 1, series number 8888.8888
Pos. D – input 4, channel K1

>>

Connection example 1

Configuration, inputs

Input 1		Sensor with analog transmission of measured data
Input of	this MET	
Channel no.	S1	
Sensor characteristics values		The menu point "Sensor characteristics values" is only visible with hydrostatic pressure transmitters.
Min. meas. range	0.00	Meas. range and sensor values are stated in the test certificate of the hydrostatic pressure transmitter.
Max. meas. range	1.00	
Min. sensor value	4.000	
Max. sensor value	20.000	
Input 4		Correction signal (key)
Input of	this MET	
Channel no.	K1	

Connection example 2

Configuration, inputs

Input 1		Sensor with digital transmission of measured data
Input of	this MET	
Sensor adaption		can be necessary for ultrasonic / radar sensors (see BA of the appropriate sensor)
Input 4		Correction signal (key)
Input of	this MET	
Channel no.	K1	

4.6.2 Configuration meas. point

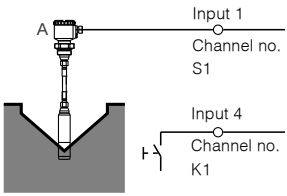
VEGAMET 514 D and 514 VD signal conditioning instruments in their basic configuration are designed for combi application, i.e.
- MST1, level
- MST2, flow measurement

Supplementary the following modifications of the configuration can be carried out.

Configuration meas. point

- Combi application
  - Application — `flow`
  - Sensor — `Hydrostatic`
  - Kind — `Standard`

  If a general modification of the basic configuration should be necessary, a "Reset to combi application" should be carried out, see respective menu point on page 44. A new basic configuration can be then programmed acc. to the product description 1.3 (see page 6).
  - Options — `no` / `offset corr.` (for MST1 and MST2)
  - Sensor coordination
    - Position A — `Input 1`
    - Position D — `Input 4`

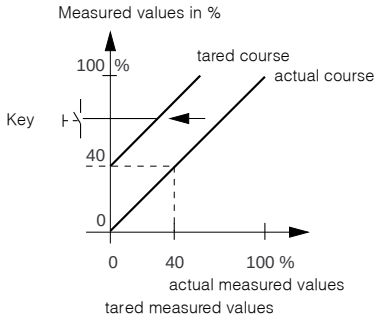


  - MST1 level
    - MST name — `MST name MST1` — Providing of a special MST name e.g. `MST name level`
    - Fault signal — `on` / `off` — on means that a failure of MST1 is transmitted to the failure processing off means no transmission
    - Tare — see page 21
    - Monitoring — see page 21
  - MST2 flow
    - MST name — `MST name MST2` — Providing of a special MST name, e.g. `MST name flow`
    - Fault signal — as above, however MST2
    - Monitoring — see page 21

Tare

By means of the tare function an additional measured value exists from the actual value beginning at 0%. The tare function can be triggered via a key connected to correction signal input 4.

Each current, voltage or relay output as well as the display can be afterwards coordinated to the tared measured value in the menu point "relating to". With the allocation or allocations the tared measured value is activated.

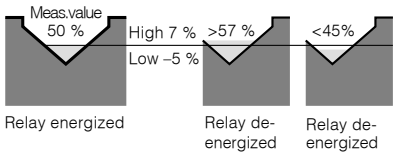


- MST1
  - Tare
    - Input

`not defined`
`Input 4` Determination of the correction signal input (key)

Monitoring

For the activation of the monitoring the following pre-requirements must be met:
- Determine in the menu range "Configuration meas. point" input 4
- Connect the key switch (opener) to input 4 (see page 13).
- Select in the menu range "Parameter adjustment relay outputs" the monitoring mode for the concerned relay (see page 37 and 40).



The selected relay is energized.

By pushing the key switch (opener opens) the respectively actual measured value is frozen and derived from this, in case the value is decreased (low) or exceeded (high) the relay energizes.

After a reset and pushing the key switch again the actual measured value is frozen again etc.

- MST1
  - Monitoring
    - Input

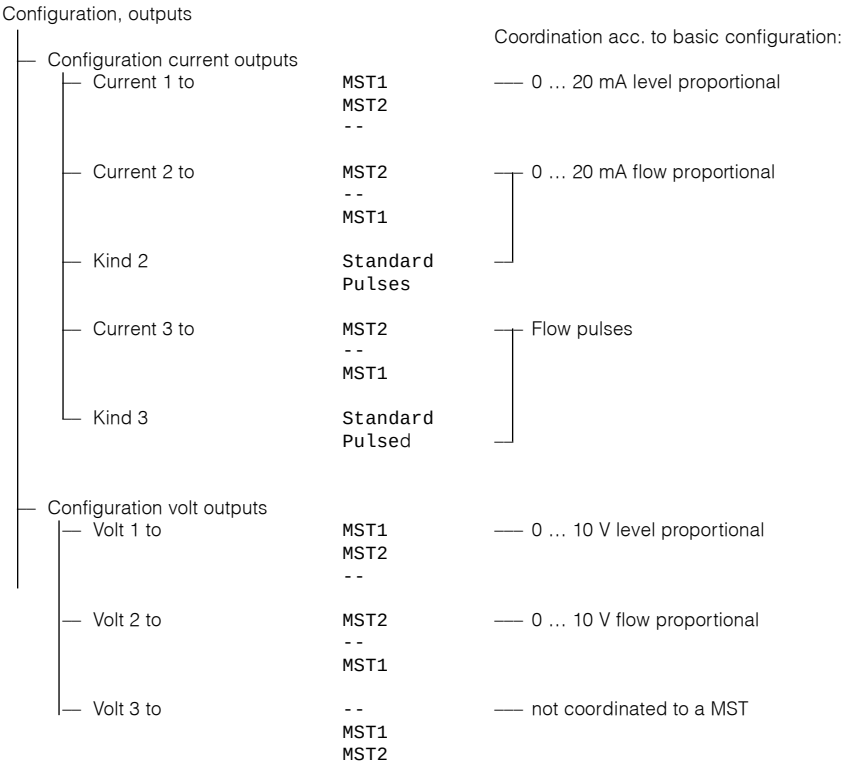
`not defined`
`Input 4` with input 4 determination of the correction signal input (key switch)

- MST2

as described above

4.6.3 Configuration output

Dependent on the basic configuration the outputs are automatically coordinated to the measuring points MST1 and MST2. This coordination can be modified separately for each output.
In a list either the measuring point numbers MST1 and MST2 or the previously adjusted measuring point names are provided as choice. In addition each output can be switched off (--), i.e. the switched off output does not access to any measuring point.

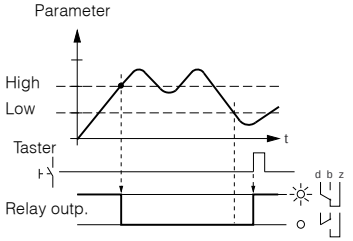


>>

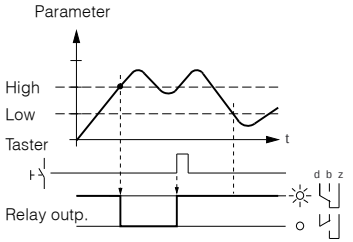
Configuration, outputs

- Configuration relay outputs
  - Operating relay
    - Relay 1 to — `MST1` — acc. to basic configuration coordinated to level
    - Relay 1 kind — `Standard`

      `Hold function`

      `Reset of alarm funct.`

      The relay modes "Hold function" and "Reset of alarm functions" are configured as described above and activated with one external signal each (correction signal input).

    - Input — `not defined` / `Input 4` — Determination of the correction signal input (key, see above)
    - Relay 2 to — `MST2` — acc. to basic configuration coordinated to flow
    - Relay 2 kind — `Standard` / `Pulses` — see Parameter adjustment page 41
  - Fail safe relay kind — `Standard` / `Hold funct.` / `Reset of alarm funct.` — The fail safe relay can be operated like the operating relay, i.e. as described above.
    - Input — `not defined` / `Input 4` — as scribed above

>>

Configuration, outputs

- Configuration PC/PLC
  - PC-/PLC-measured values
    - PLC 1 to `MST1`
    - PLC 2 to `MST2`
    - PLC 3 to `--`
    - PLC 4 to `--`
    - PLC 5 to `--`
    - PLC 6 to `--`
    - PLC 7 to `--`
  - PC/PLC relay status `off` / `on`
  - PC/PLC Inp. status `off` / `on`
- Configuration VEGADIS
  - PC-/PLC-measured values
    - DIS 1 to `MST1`
    - DIS 2 to `MST2`
    - DIS 3 to `--`
    - DIS 4 to `--`
    - DIS 5 to `--`
    - DIS 6 to `--`
    - DIS 7 to `--`

Dependent on the basic configuration outputs are automatically coordinated to measuring points MST1 and MST2.

This coordination can be modified separately for each output. In a list either the measuring point numbers MST1 and MST2 or the previously adjusted measuring point names are available as a choice.

Example acc. to configuration measuring point

```
MST
name
level
```

```
MST
name
flow
```

In addition each output can be switched off (– –), i.e. the switched off output does not access to any measuring point.

Configuration as abobe

Parameter adjustment of outputs see page 41

4.7 Set-up, parameter adjustment

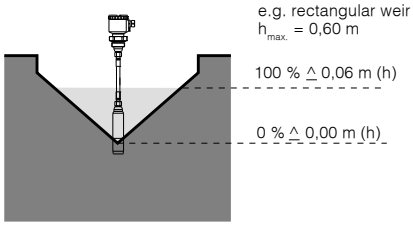
The menu described in the following is available for parameter adjustment. This menu has the same function for VEGAMET 514… for each measuring point number, i.e. parameter adjustment MST1 and MST2.

4.7.1 Parameter adjustment MST1, adjustment

The menu range "Parameter adjustment MST1, adjustment" adapts automatically to the measuring point configuration, i.e. acc. to the "Application" and "Sensor" different menu points are displayed.

Adjustment

- Application — Flow measurement
- Sensor — Hydrostatic pressure transmitters



Parameter adjustment MST1, adjustment

with measured product		With this adjustment procedure %-values each must be adjusted for min. and max. which correspond to the actually measured levels/flow etc.
Min. adjustment at	0.0 %	Range 0 … 80 %
Max. adjustment at	100.0 %	Range 20 … 100 % a Δ of 20 % must be observed between min. and max.

Please observe that for all these applications with hydrostatic pressure transmitters and adjustment without level/flow first of all a position correction must be carried out.

without measured product		For this adjustment procedure two future levels/flows must be adjusted which correspond to 0% and 100%.
Adjustment in	m (h)	etc. modify unit if necessary
Position correction		The menu points "Position correction" etc. are released when connecting hydrostatic pressure transmitters.
Sensor unpressurized? OK?		With the position correction the measured data of the unpressurized sensor (flume empty) are detected
Position correction now? OK?		as correction size and is considered for all following measurements
0 % at	0.00 m (h)	the unit is displayed acc. to the menu point "Adjustment in"
100 % at	0.60 m (h)	0.00 and 0,60 correponds e.g. to an adjustment in m

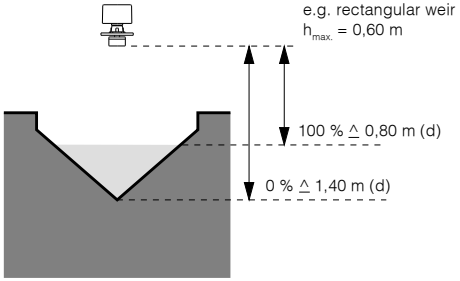
Parameter adjustment MST2, adjustment — as described above.

If you want to detect the level and the flow as parameter, it is recommended to carry out the adjustment for MST1 and MST2 at the same time, i.e. immediately one of the other.

>>

Adjustment

- Application — Flow measurement
- Sensor — ultrasonic sensors, radar sensors



Parameter adjustment MST1, adjustment

with measured product		With this adjustment procedure %-values have to be adjusted each for min. and max. which correspond to the actual measured distances between sensor and level/flow.
Min. adjustment at	`0.0 %`	Range 0 … 80 %
Max. adjustment at	`100.0 %`	Range 20 … 100 % a Δ of 20 % must be observed between min. and max.
without measured product		For this adjustment procedure two future distances (sensor … level/flow) must be adjusted which correspond to 0 % and 100 %.
Adjustment in	`m (d)`	etc. if necessary modify unit, the unit is displayed acc. to the menu point "Adjustment in"
0 % at	`0.80 m(d)`	0.80 and 1.40
100 % at	`1.40 m(d)`	corresponds e.g. to adjustment distances in m

Parameter adjustment MST2, adjustment as described above

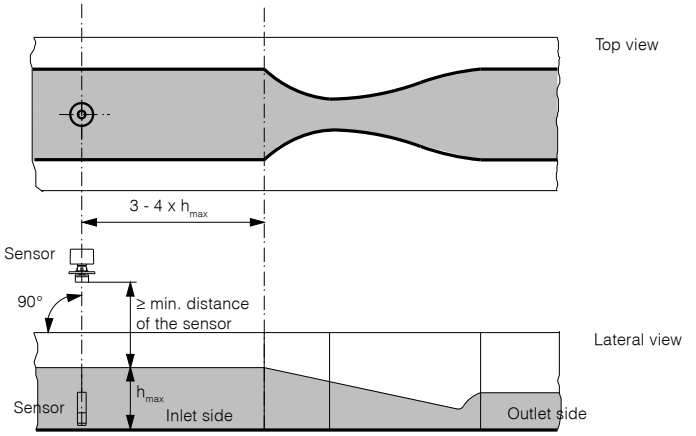
If you want to detect the level and the flow as parameter, it is recommended to carry out the adjustment for MST1 and MST2 at the same time, i.e. immediately one of the other.

4.7.2 Flow measurement

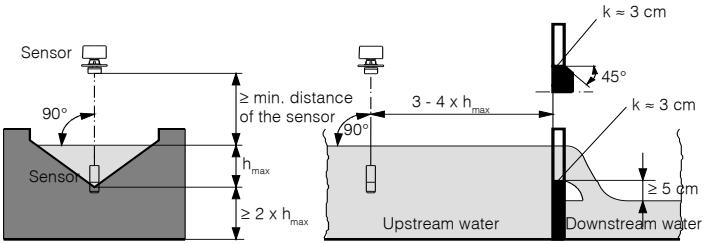
General information

In the following section elementary information to dimensions in front of flumes, walls and sensor installation positions is given.

Flume with meas. section (e.g. Khafagi-Venturi flume)



Fth meas. wall (e.g. rectangular weir)



Note

General
- h_{max} is the max. damming or overflow height acc. to the meas. section or meas. wall.
- All other dimensions are nearly derived from h_{max} (see above drawings)

Sensor mounting position
- Mount sensor on the inlet /upstream water side.
- Observe distance 3 - 4 x h_{max} from sensor to the throat or meas. wall.
- Mount the ultrasonic and radar sensors centred to the flume and vertically to the flow medium.
- Consider with ultrasonic sensors the min. distance to hmax.

Meas. wall
- Dimension dependent on h_{max}.
- Thickness on the meas. wall (horizontal part) k ≈ 3 mm.
- Swelling of the meas. wall with a transition of 45° (see above drawing).
- Distance from the opening of the meas. wall to downstream water ≤ 5 cm.

>>

Max. flow, Q_{max}

In the term Q_{max} (menu point 100 % corresponds to 1000) the following flume specific factors are considered relating to the adjustment at 100 %
- geometry of the flume
- material of the flume
- flow speed of the flow medium.

The respectively valid values for Q_{max} are normally determined by the manufacturer of the flume.

If the value for Q_{max} of an existing flume is not known this value can taken as a proximity out of the following schedule or can be calculated.

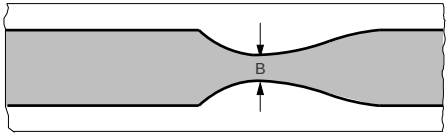
In addition it is recommended to determine and observe the frame conditions defined in the literature to the flow measurement (surface structure of the flume, flow speed etc.).

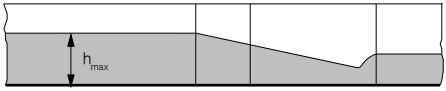
Some of the usual flumes are stated in the following in form of schedules and calculation examples.

Explanations
Q_{max} = maximum flow in m^3/h
Q_{min} = minimum flow in m^3/h
h_{max} = maximum damming or overflow height in mm or m
h_{min} = minimum damming or overflow height in mm or m
B = flume or overflow width in mm or m
K = flume or overflow specific factor
k = thickness of the meas. wall in mm
D = tube diameter in inch

Calculation information
- Liter/sec x 3,6 = m^3/h
- $m^3/h \times \frac{1}{3,6}$ = liter/sec
- Example 10 liter/sec ≙ 36 m^3/h

Khafagi-Venturi flume
With rectangular cross section and even canal bottom





Values for Q_{max}

B in mm	K (Factor)	Q_{max} in m^3/h	h_{max} in mm	Q_{min} in m^3/h	h_{min} in mm
45	605	80	260	4,8	40
120	838	124	280	9,3	50
160	1106	210	330	16,2	60
200	1383	363	410	25,6	70
240	1654	532	470	37,4	80
320	2178	864	540	58,8	90
640	4280	3776	920	383	200

Calculation of Q_{max}

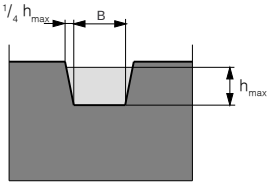
The following formula can be used for calculation of the actual flow of liquid levels < h_{max} … h_{min}.

Presumed values for a calculation example
B = 0,16 m
K = 1106 (derived from B)
h = 0,25 m

$Q_{max} = K \times h^{5}$
$= 1106 \times 0,25^{1,5}$
$= 138,2\ m^3/h$

>>

Trapezoidal weir (Cipolletti)
With sharp overflow edge



Values for Q_{max}

B in mm	K (Factor)	Q_{max} in m³/h	h_{max} in mm	Q_{min} in m³/h	h_{min} in mm
300	2011	116,8	150	29,5	60
450	3014	354,4	240	44,3	60
600	4011	760,4	330	58,9	60
800	5353	1457	420	78,7	60
1000	6688	2581	530	93,3	60
1500	10043	6523	750	147,6	60
2000	13381	14397	1050	196,7	60
3000	20082	36893	1500	295,1	60

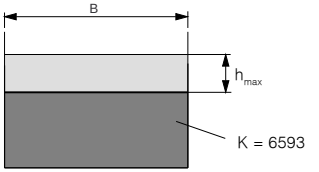
Calculation of Q_{max}

The following formula can be used for calculation of the actual flow of liquid levels < h_{max} … h_{min}.

Presumed values for a calculation example
B = 0,6 m
K = 4011 (derived from B)
h = 0,27 m

Q_{max} = K x h^{5}
= 4011 x $0,27^{1,5}$
= 562,73 m³/h

Rectangular overflow without contraction
With sharp overflow edge without throat



Values for Q_{max}

B in mm	Q_{max} in m³/h	h_{max} in mm	Q_{min} in m³/h	h_{min} in mm
200	54,81	120	19,4	60
400	310	240	38,7	60
600	650	300	58,1	60
800	1592	450	77,5	60
1000	3064	600	96,9	60
1500	6423	750	145,3	60

Calculation of Q_{max}

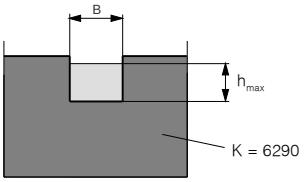
The following formula can be used for calculation of the actual flow of liquid levels < h_{max} … h_{min}.

Presumed values for a calculation example
B = 1,5 m
K = 6593
h = 0,3 m

Q_{max} = B x K x $h^{1,5}$
= 1,5 x 6593 x $0,3^{1,5}$
= 1625 m³/h

>>

Rectangular overflow without contraction
With sharp overflow edge and throat



Values for Q_{max}

B in mm	Q_{max} in m^3/h	h_{max} in mm	Q_{min} in m^3/h	h_{min} in mm
200	52,3	120	18,5	60
300	109,6	150	27,7	60
400	295,8	240	37,0	60
500	441,2	270	46,2	60
600	620	300	55,5	60
800	1519	450	73,9	60
1000	2923	600	92,4	60
1500	6128	750	138,7	60
2000	13535	1050	184,9	60
3000	34666	1500	277,3	60

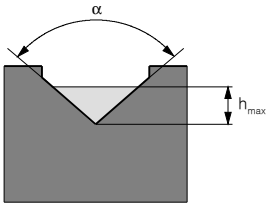
Calculation of Q_{max}

The following formula can be used for calculation of the actual flow of liquid levels < h_{max} … h_{min}.

Presumed values for a calculation example
B = 0,4 m
K = 6290
h = 0,13 m

$Q_{max} = B \times K \times h^{1,5}$
$= 0,4 \times 6290 \times 0,13^{1,5}$
$= 117,9\ m^3/h$

Rectangular flume (V-Notch)
With sharp overflow edge



Values for Q_{max}

α in °	K (Factor)	Q_{max} in m^3/h	h_{max} in mm	Q_{min} in m^3/h	h_{min} in mm
90	4966	1385,0	600	4,4	60
60	2869	800,0	600	2,5	60
45	2056	573,3	600	1,8	60
30	1334	372,0	600	1,2	60
22,5	989	275,8	600	0,87	60

Calculation of Q_{max}

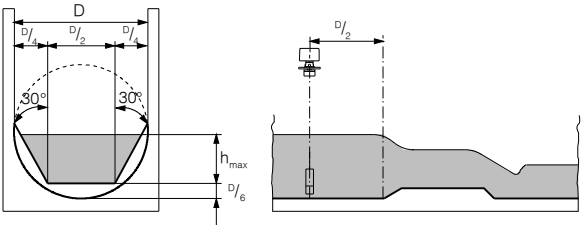
The following formula can be used for calculation of the actual flow of liquid levels < h_{max} … h_{min}.

Presumed values for a calculation example
α = 45°
K = 2056 (derived from α)
h = 0,33 m

$Q_{max} = K \times h^{2,5}$
$= 2056 \times 0,33^{2,5}$
$= 128,6\ m^3/h$

>>

Palmer-Bowlus-Flume



Values for Q_{max}

D in Zoll	K (Factor)	Q_{max} in m³/h	h_{max} in mm	Q_{min} in m³/h	h_{min} in mm
6"	1952	37,82	120	2,9	30
8"	2338	68,60	150	7,3	45
10"	2712	148,8	210	12,3	55
12"	3046	214,3	240	18,9	65
15"	3519	374,8	300	32,1	80
18"	3943	501,4	330	54,4	100
24"	4745	1074,0	450	114,5	135
30"	5488	2122,0	600	192,3	165

Note:
The data of above schedule relate to Palmer-Bowlus-Flumes of Messrs. Plasti-Fab.

Calculation of Q_{max}

The following formula can be used for calculation of the actual flow of liquid levels < h_{max} ... h_{min}.

Presumed values for a calculation example
D = 12"
K = 3046 (derived from D 12")
h = 0,2 m

$Q_{max} = K \times h^{86}$
$= 3046 \times 0{,}2^{1.86}$
$= 152{,}63$ m³/h

4.7.3 Parameter adjustment MST1 and MST2, processing

Parameter adjustment MST1, processing (level)

Scaling		
0 % corresponds to	0.0	both values can be additionally influenced
100 % corresponds to	100.0	with the determination of the decimal point
Decimal point	888.8 .8888	
relating to	Percent	etc. choice out of list (scaled)
Unit	%	etc. choice adapted to above determination
Linearization curve	linear Lin.curve 1 Lin.curve 2 Lin.curve 3	enquiry of three curves to be edited Editing see page 42

After a scaling or linearization the requested output must be coordinated to the scaled or linearized value in the menu range "Parameter adjustment outputs", see menu points "relating to" and "Unit".

Integration time	0 s	Range 0 … 600 sec.

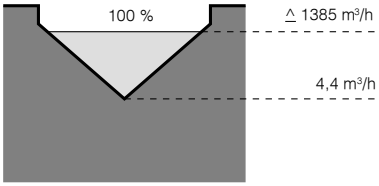
>>

Parameter adjustment MST2, processing (flow)

With the scaling of MST2 the conditions for the signal conditioning instrument is provided to calculate the flow volume/time. The respective values for min. and max. flow are generally stated by the flume manufacturers or can be calculated as proximity values (see page 29 … 32).

In case of calculation the value of min. flow is unimportant.

Example relating to a rectangular flume (see page 31):
- Max. flow 1385 m³/h
- Min. flow 4,4 m³/h



Parameter adjustment MST2, processing (flow)

- Scaling
  - 0 % corresponds to `0` — Range 0 … (4) … 9999 (Min. flow)
  - 100 % corresponds to `1000` — Range 0 … (1385) … 9999 (Max. flow). This value (1385) is automatically transferred to the menu point "Pulse parameter volume", see page 36 and 41.
  - Decimal point `888.8` / `.8888`
  - relating to `flow`
  - Unit `L/s` — etc. choice adapted to flow measurement
- Linearization curve — `linear`, `Root funct.`, `Venturi`, `Palmer-Bowlus`, `Quadrant`, `V-Notch`, `Trapezoidal weir`, `Rectangular overflow` — Given curves for flumes and series
  `Lin.curve 1` — Enquiry of three curves to be edited
  `Lin.curve 2` — Editing see page 43
  `Lin.curve 3`

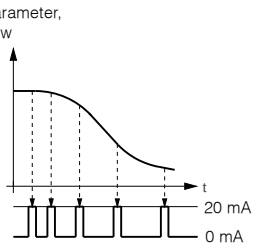
  After a scaling or linearization the requested output must be coordinated to the scaled or linearized value in the menu range "Parameter adjustment outputs", see menu points "relating to" and "Unit".

- Integration time `0 s` — Range 0 … 600 sec.

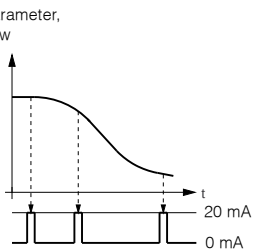
4.7.4 Parameter adjustment MST1 and MST2, outputs

Parameter adjustment MST1 and MST2, outputs

- Current outputs
  - Current output 1 — acc. to basic configuration coordinated to MST1, i.e. 0 … 20 mA relating to level
    - relating to — `Percent` — etc. choice acc. to list
    - Unit `%` — etc. choice adapted to above determination
    - Current output
      - `4/20 mA`
      - `0/20 mA`
      - `20/4 mA`
      - `20/0 mA`
      - `-free-` — activated the menu points "Current at 0% and 100%"
    - Current at 0 % — `4 mA` — adjustable range 0.0 … 20.0 mA
    - Current at 100 % — `20 mA` — adjustable range 0.0 … 20.0 mA
    - at failure — reaction of the current output in case of failure
      - `0 mA` — 0 mA
      - `22 mA` — 22 mA
      - `--` — actual current value is kept
      - `0 %` — current value relating to 0 %
      - `100 %` — current value relating to 100 %
  - Current output 2 — acc. to basic configuration coordinated to MST2, i.e. 0 … 20 mA relating to flow, otherwise like current output 1. The output can be also configured for pulses, see menu range of current output 3
  - Current output 3 — acc. to basic configuration coordianted as pulse output MST2
    - Kind
      - `Pulse output`



      - `Sampling output`



>>

Parameter adjustment MST1 and MST2, outputs

- Current output 3 (continuation)
  - Pulse parameter
    - Volume — `1000` — Range 0 … 9999
    - Quantity x factor — `1` — Multiplication factor x1, x10, x100, x1000
  - Creeping quantity suppression — `0 %` — Range 0 % … 100 %
  - Sampling — `h 1` — Range 1 … 100 h (hours)
    This menu point is only displayed in mode "Sampling output".
- Volt outputs
  - Volt output 1 — acc. to basic configuration coordinated to MST1, i.e. 0 … 10 V relating to level
    - relating to — `Percent` — etc. choice acc. to list
    - Current output
      - `2/10 V`
      - `0/10 V`
      - `10/2 V`
      - `10/0 V`
      - `-free-` — activates the menu points "Current at 0% and 100%"
    - Volt at 0 % — `2 V` — adjustable range 0.0 … 10.0 V
    - Volt at 100 % — `10 V` — adjustable range 0.0 … 10.0 V
    - at failure — Reaction of the volt output in case of failure
      - `0 V` — 0 V
      - `11 V` — 11 V
      - `--` — Actual value is kept
      - `0 %` — Volt value relating to 0 %
      - `100 %` — Volt value relating to 100 %
  - Volt output 2 — as volt output 1, however acc. to basic configuration coordinated to MST2, i.e. 0 … 10 V relating to flow.
    Volt output 2 can be configured to level like volt output 1.
  - Volt output 3 — as basic configuration coordinated to no MST (– –).

Parameter adjustment MST1, outputs

- Relay outputs
  - Relay output 1 — acc. to basic configuration coordinated to MST1, i.e. level
    - relating to — `Percent` — etc. choice acc. to list
    - Unit — `%` — etc. choice adapted to above determination
    - Kind
      `Overfill protection`
      `Prot. against dry running of pumps`
      `Switching window` Off
      `Switching window` Off see additionally page 38 … 40
      `Tendency rising`
      `Tendency falling`
      `Monitoring`
    - Low — `0.0 %`
    - High — `100.0 %`

      In these menu points the switch points can be determined for above relay modes (except "Tendency rising" and "Tendency falling").

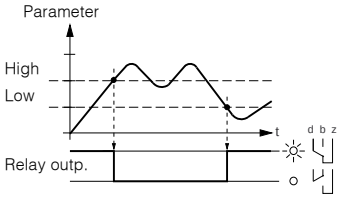
      Range and unit acc. to selection in menu point "relating to" and "Unit", see above
    - at failure — `off` — Reaction of the relay output in case of failure
      - Relay de-energizes
      `--` - Actual switching condition is kept
    - additional functions
      - Switching delay
        - t on — `0 s` — Switch on delay
        - t off — `0 s` — Switch off delay
  - Relay output 2 — see page 41

>>

Relay output 1 (continuation 1)

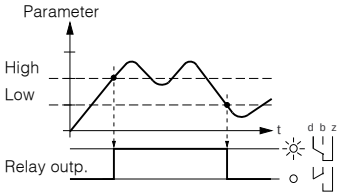
Kind Overfill protection

The relay of relay output 1 de-energizes at switch point "High" (reliable switching condition)



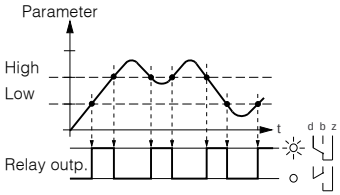
Protection against dry running of pumps

The relay of relay output 1 de-energizes at switch point "Low" (reliable switch point)



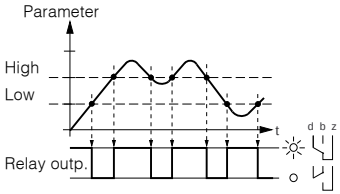
Switching window On

The relay of relay output 1 is energized within the switching window



Switching window Off

The relay of relay output 1 is de-energized within the switching window



>>

Tendency determination

The level change within the scanning time (ta) is determined and after all scannings (n) an average value is generated out of the sum of the level changes.

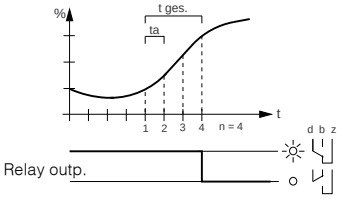
If this average value exceeds a previously defined %-value, the tendency determination responds, i.e. an energized relay de-energizes.

With the enquiry of "Tendency rising" or "Tendency falling" the menu points "Deviation in %" and "Deviation per time" are released.

Relay output 1 (continuation 2)

- Kind Tendency rising

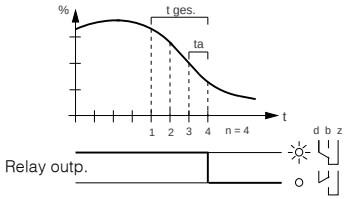
  The relay of relay output 1 de-energizes, when the increasing average value of "t ges." exceeds the previously defined %-value



ta = Scanning time
n = Number of scannings

  Tendency falling

  same function however with falling average value



ta = Scanning time
n = Number of scannings

- Deviation in % `2` — The level change exceeds the adjusted %-value, the tendency determination responds.
  0 … 110 %
  Example 2 % (modification) per t ges.
- Deviation per time
  - Scanning time in s `60` — Adjustment range 0 … 999 s
    Example 60 s corresponds to 1 minute
  - Number of scannings `4` — Adjustment range 0 … 99 scannings
    Example: t ges = ta • n = 60 • 4 = 240 s = 4 min, i.e. after every 4 mins the average value of the deviation is formed and the result is compared with the given deviation in %, here in the example = 2%

>>

Monitoring

The following requirements must be met for activation of the monitoring:
- Determine input 4 in the menu range "Configuration meas. point".
- Connect a key word (opener) to input 4 (see page 14).
- Select for the concerned relay the mode monitoring in the menu range "Parameter adjustment relay outputs" (see page 37).

The selected relay is engergized. By pushing the key switch (opener opens) the respective actual measured value is first of all frozen and derived thereof the relay de-energizes if the value is decreased (low) or exceeded (high).

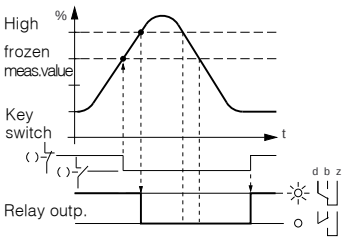
See additional diagram "Configuration meas. points" page 21.

Relay output 1 (continuation 3)

Kind Monitoring — With the enquiry "Monitoring" the menu point "Monitoring on" is released.

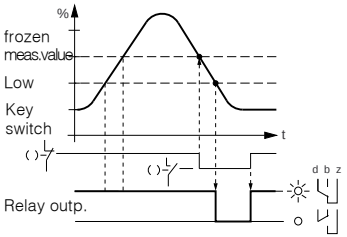
Monitoring on `High`

The relay of relay output 1 de-energizes when the %-value stated under High is exceeded.



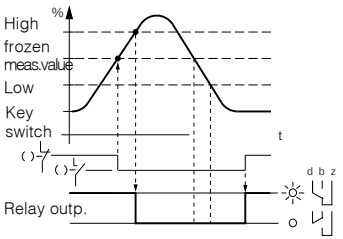
`Low`

The relay of relay output 1 de-energizes when the %-value stated under Low is decreased.



`High and Low`

The relay of relay output 1 de-energizes when the %-value stated under High and Low is exceeded or decreased.



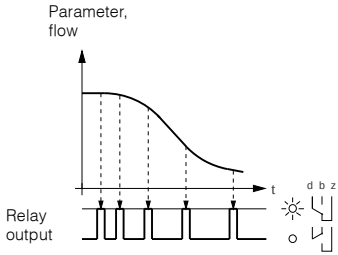
Low `-5 %`
High `7 %`

Range and unit acc. to the selection in the menu points "relating to" and "Unit", see page 34.
–5 % and 7 % are exemplary values, relating to above diagrams.

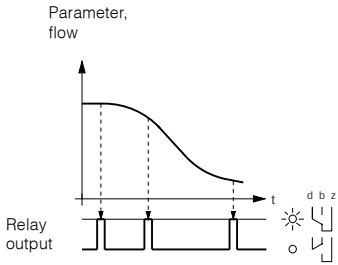
>>

Parameter adjustment MST2, outputs

- Relay outputs
  - Relay output 2 — acc. to basic configuration coordinated to MST2, i.e. flow
    - Kind — `Pulse output`



`Sampling output`



    - Pulse parameter
      - Volume — `0` — Range 0 … 9999
      - Quantity x factor — `1` — Multiplication factor x1, x10, x100, x1000
    - Creeping quantity suppression — `0 %` — Range 0 % … 100 %
    - Sampling — `h 1` — Range 1 … 100 h (hours)
      This menu point is only displayed in the mode "Sampling output".

Parameter adjustment MST1 and MST2, outputs

- MET-indication
  - relating to — `Percent` / `scaled` — etc. choice acc. to MST-enquiry
  - Unit % — `scaled` — etc. choice adapted to above determination
- PC/PLC-outputs
  - PC/PLC output 1
    - relating to — `Percent` / `scaled` — etc. choice acc. to MST-enquiry
    - Unit % — `scaled` — etc. choice adapted to above determination
  - PC/PLC output 2 … 7 — as described above
- DIS-outputs
  - DIS-output 1
    - relating to — `Percent` / `scaled` — etc. choice acc. to MST-enquiry
    - Unit % — `scaled` — etc. choice adapted to above determination
  - DIS-output 2 … 7 — as described above

4.7.5 Parameter adjustment MST1 and MST2, simulation

Note
The whole indication flashes with activated simulation. The measured data delivered from the sensors are not transmitted for processing, therefore this menu point should be quit as soon as possible. Reset to the indication of measured values automatically after 60 minutes.

Parameter adjustment MST1, simulation

- Simulation now! OK?
  - Simulation — with [+] or [–]

4.7.6 Parameter adjustment MST1 and MST2, special functions

Parameter adjustment MST1 and MST2, special functions

Reset meas. point (e.g. level or flow) Reset OK? Reset now! OK?		Reset of all parameter values of the meas. point MST1 or MST2 with this reset to factory setting.

Failure mode	`Standard`
	`<-10%`
	`<110%`
	`>110%`
	`<-10a.>110%`
	`<-110a.>110%`
		no fault signal
		Fault signal with decreasing and/or exceeding of the adjusted measuring range

Manual corrections		
Offset correction		Only visible with hydrostat. pressure transmitters. Carry out correction only with unpressurized sensor.
Offset correction OK?		
Correction now! OK?		

4.8 Set-up, additional functions

4.8.1 Password

Additional functions

Password	`off` `on`	each menu point can be enquired and modified the password can be enquire menu point with [+] and [–]. With the adjustment of password the whole menu is released again. Password for VEGAMET 514 D … and 514 VD = -0514-

4.8.2 Linearization curve 1 … 3

A linearization curve is generated by a certain number of index markers and their value pairs. A value pair consists of a value for level percent (X %) and a value for volume percent (Lin %). Up to max. 32 index markers can be added.

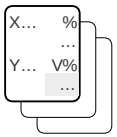
A linearization curve can be terminated after any individual number of index markers. The signal conditioning instrument terminates automatically the linearization curve with the values X = 100 % and Y = 100 %.

The input of a linearization curve is made in the menu point "Add index marker".

>>

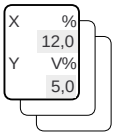
Additional functions

- Edit linearization curve
  - Linearization curve 1
    - Lin. curve 1
      - Edit lin.curve 1
        - Y … V %



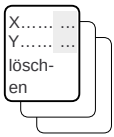
Number of index markers 1 … 32 with [→] or [←]
Edit the Y-value with [+] or [–], take over with [OK].

      - Add index marker
        - X ……
        - Y ……



The new value pair is added automatically with [OK] at the correct position of the linearization curve. The already available index markers are sorted again.

      - Delete index markers
        - X ……
        - Y … delete?
          - Delete now?



Enquiry of the value pairs with [→] or [←]

With [OK] the value pair and the appropriate index marker is deleted out of the linearization curve. The remaining index markers and their value pairs move up

    - Lin. curve 2
    - Lin. curve 3

as described above

4.8.3 Info

All following menu points have display function.

Additional functions

- Info
  - Input Info
  - VEGAMET Info
  - Program Info
  - Meas. point Info

detailled information
- for input configuration
- for VEGAMET configuration
- to program
- to the individual meas. points

4.8.4 Language

Additional functions

- Language
  - Deutsch
  - English
  - Francais
  - Italiano
  - Espanol

Preadjustment and acc. to request modification, without data loss

4.8.5 VEGAMET Reset

Additional functions

- VEGAMET Reset
  - Reset configuration
    - to default — With reset to default the whole configuration and the whole parameter adjustment (if necessary all MST) are reset to factory setting The basic configuration however remains, e.g. pressurized level measurement.
      - Reset OK?
        - Reset now! OK?
    - to combi application — The combi application available at the moment is deleted and in their position a preconfiguration to the new combi application to be adjusted is generated, see page 6.
      - delete all MST?
        - etc.
  - Reset sensor values
    - Reset Input 1 — The sensor data of the sensor connected to input 1 are deleted
      - Reset OK?
        - Reset now! OK?
  - Reset linearization curves
    - Reset lin. curve 1 — With this reset you delete the index markers of linearization curve 1
      - Reset OK?
        - Reset now! OK?
    - Reset lin. curve 2 — as above, however linearization curve 2
    - Reset lin. curve 3 — as above, however linearization curve 3
    - Reset all curves — as above, however all linearization curves

4.8.6 Service

Additional functions

- Service
  - Current output `1...3` — the actual currents and voltages are
  - Volt output `1...3` — indicated

5 Diagnosis

5.1 Detailled menu list

Configuration

- Configuration, inputs
  - Input 1 (analog)
    - Input of
    - Channel no.
    - Sensor characteristic values

    or
  - Input 1 (VBUS)
    - Input von
    - Series no.
    - Sensor adaption
  - Input 4
    - Input of
    - Channel no.
- Configuration meas. points
  - Application
  - Sensor
  - Kind
  - Options
  - Sensor coordination
  - MST1
    - MST-name, MST1
    - Fault signal
    - Tare
    - Monitoring
  - MST2, as MST1 (without tare)
- Instrument address
  (deleted up from Software-Version 6.0)
- Configuration outputs
  - Configuration current outputs
    - Current 1 to (coordination)
    - Current 2 to (coordination)
    - Current 2 Standard (Kind)
    - Current 3 to (coordination)
    - Current 3 Standard (Kind)
  - Configuration volt outputs
    - Volt 1 to (coordination)
    - Volt 2 to (coordination)
    - Volt 3 to (coordination)
  - Configuration relay outputs
    - Operating relay
      - Rel. 1 to (coordination)
      - Rel. 1 Standard (Kind)
      - Rel. 2 to (coordination)
      - Rel. 2 Standard (Kind)
    - Fail safe relay
      - Relay Standard
  - Configuration PC / PLC-outputs
    - PC / PLC-output
      - PLC 1 to (coordination)
        bis
      - PLC 7 to (coordination)
    - PC / PLC-relay status
    - PC / PLC-input status
  - Configuration VEGADIS
    - DIS 1 to (coordination)
      bis
    - DIS 7 to (coordination)

Parameter adjustment

- Adjustment
  - with level / flow
    - Min. adjustment
    - Max. adjustment
  - without level / flow
    - Adjustment in
    - Position correction
    - 0 % at
    - 100 % at
- Processing
  - Scaling (flow)
    - 0 % corresp. (Min.-flow)
    - 100 % corresp. (Max.-flow)
    - Decimal
    - relating to
    - Unit
  - Lin. curves
  - Integration time
- Outputs
  - Current outputs
    - Current output 1
      - relating to
      - Unit
  - Volt outputs
    - Volt output 1
      - relating to
      - Unit
  - Relay outputs
    - Relay output 1
      - relating to
      - Unit
      - Kind
      - Low
      - High
- MET-indication
- PC / PLC-outputs
- DIS-outputs
- Simulation
- Special functions
  - Reset meas. point
  - Failure mode
  - Manual corrections

Additional functions

- Password
- Edit lin. curves
  - Lin. curve 1
  - Lin. curve 2
  - Lin. curve 3
- Info
  - Input info
  - VEGAMET-Info
  - Program info
  - Meas. point info
- Language
- Reset VEGAMET
  - Reset configuration
  - Reset sensor values
  - Reset lin. curves
- Service

5.2 Maintenance

The instrument is maintenance free.

5.3 Repair

Due to safety and guarantee reasons repair work beside the wiring must only be made by VEGA-staff.

In case of a defect please return the respective instrument with a short description of the error to our repair department.

5.4 Fault signal

The signal conditioning instrument and the connected sensor are permanently monitored during operation. During the parameter adjustments to adjusted values are checked on plausibility. In both cases fault signals can be caused by irregularities.

In case of failure an error code is indicared on the display (only in the range indication of measured values), the fail safe relay de-energizes, the failure LED lights and the outputs react acc. to their control condition.

The error codes are listed in section 5.5 on the following pages.

The diagnosis info is transferred by means of a current text indication.

Configuration
You can determine separately for each meas. point, if a fault signal should be transferred or not. See menu range "Configuration meas. point" menu point "Fault signal", see page 21.

Parameter adjustment
In the menu point "Failure mode" can be determined separately for each measuring point how a decreasing of the measuring range should trigger a fault signal.

5.5 Error codes

Error code	Meaning
E004	This operation is not supported by the instrument (different software version). You tried to activate a function with a newer software version of VEGA Visual Operating in an instrument with older software version. However the instrument cannot support this operation. Please update the software of your instrument.
E007	Sensor type not suitable. A VBUS-sensor with the serial number stated by you was found, however the sensor does not correspond. Please check the adjusted serial number or change the configuration.
E008	VBUS-sensor not found. The sensor cannot be found. Reasons: - sensor is not connected - no sensor connected with this serial number - line break (VBUS) - shortcircuit (VBUS) - the sensor is defect - interfered communication (VBUS) probably - interference in the VBUS-transmitter/receiver part of VEGAMET Please check the serial number, the connection line, the sensor and if necessary the VEGAMET.
E010	The serial numbers of the connected VBUS-sensor has not been coordinated.
E013	VBUS-sensor signals failure. The VBUS-sensor signals failure; the communication with the sensor however is okay. Reasons: - failure on the VBUS-sensor Please check the VBUS-sensor.
E014	Suspected shortcircuit Reasons: - shortcircuit - sensor is defect Please check the connection line and if necessary the sensor.
E015	Suspected line break Reasons: - no sensor connected - line break - sensor is defect Please check the connection line and if necessary the sensor.
E016	Empty/full adjustment exchanged. The values for the empty adjustment are higher than the values for the full adjustment. Please carry out adjustment again.
E017	Adjustment span too small. The adjustment values are too close togther or are identical. Please carry out adjustment again.
E021	Span of the sensor characterstic values too small or values exchanged. The sensor characteristic values are too close together or are identical or the min. sensor characteristic value is higher than the max. sensor characteristic value. Please check the sensor charactersistic values.

Error code	Meaning
E029	Measured valuated. The measured value is generated by simulation and does not reflect the real condition.
E031	Same DISBUS-address. At least another instrument with the same DISBUS-address is connected to this instrument. Please check the DISBUS-address.
E032	Instrument address 0. Instrument address 0 is adjusted on VEGAMET. With this address VEGAMET does not participate in the DISBUS-communication, even the DISBUS is wired. If necessary modify the instrument address.
E034	Instrument error. A considerable error was detected on the instrument (possibly defect EEPROM). Please disconnect voltage and then connect again (cold start). If the error does not extinguish, please contact your VEGA-agency.
E035	Instrument error. A considerable error was detected on the instrument (possibly check sum error in EEPROM). Please disconnect voltage and then connect again (cold start). If the error does not extinguish, please contact your VEGA-agency.
E050	Remote VEGAMET not found. The VEGAMET from which a measured value is expected, cannot be found. Reasons: - the remote VEGAMET is not connected - no VEGAMET with this instrument address connected - line break (DISBUS) - shortcircuit (DISBUS) - the remote VEGAMET is defect - interfered communication (DISBUS) probably - interference in the DISBUS-transmitter/receiver part of VEGAMET Please check the instrument address on both VEGAMET, the connection line, the remote VEGAMET and if necessary this VEGAMET.
E051	Failure during the transmission of measured values via DISBUS. It is not possible to receive a valid measured value via DISBUS from the remote VEGAMET; the communication to the remote VEGAMET however is okay. Reasons: - failure on the remote VEGAMET - the input of the remote VEGAMET which should be transmitted, is not yet configured Please check the remote VEGAMET and if necessary its input configuration.
E052	Input number not yet coordinated.
E053	Span of the sensor characteristic values too small.
E054	Sensor characteristic values exchanged.
E055	The hysteresis on the correction signal input is too small.
E060	Span of the current output values too small. The values for the current output are too close together or are identical. Please check the adjustment of the current output.
E061	Span of the voltage output values too small. The values for the voltage output are too close together or are identical. Please check the adjustment of the voltage output.
E062	Pulse parameters too small. The pulse parameters in relation to the max. flow are too small, i.e. with this adjustment the time between two pulses would be less than one second. Please check the relation of pulse parameters to max. flow.

Error code	Meaning
E070	Scaling span too small. The values of the scaling are too close together or are identical. Please check the adjustments of the scaling.
E102	On this VEGAMET a reset of the configuration has been carried out via the keyboard.
E110	Switching hysteresis too small. The switch points are too close together or are identical.
E111	Relay switch points exchanged. The values for the relay switch points relating to the selected relay mode are exchanged.
E4.50	Wrong DISBUS-address adjusted.
E4.51	Wrong VEGADIS-number adjusted.
E9.10	No communication on DISBUS.

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